



**Remedial Activities
Work Plan**

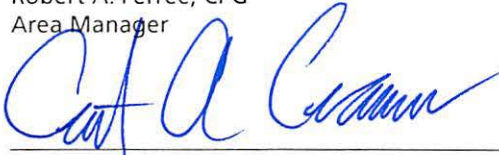
13700 Mount Elliott Avenue,
Detroit, Michigan

PREPARED FOR

General Die Casting Company
2677 Comfort
West Bloomfield, Michigan



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**Remedial Activities Work
Plan**

13700 Mount Elliott Avenue,
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MI000601.0004.00005

Date:

20 July 2000

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1. Introduction

This document prepares the specific tasks to be conducted as part of the remediation of the former General Die property located at 13700 Mount Elliott Avenue in Detroit, Michigan (see Figure 1). ARCADIS Geraghty & Miller, on behalf of General Die Casting Company (General Die Casting), completed a Focused Feasibility Study (FFS) for the Mount Elliott site. The objective of the FFS was to facilitate the development and selection of an environmentally-sound, cost-effective remedial alternative which may be implemented at impacted areas of the former site and the driveway of the adjacent Central Steel & Wire property (see Figure 2) to ensure the protection of human health and the environment. The FFS was prepared to comply with the overall qualifications of remedy selection under the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA).

This Remedial Work Plan will present the separate tasks required to complete the remediation of the former General Die Casting site prior to the submittal of a Remedial Action Plan (RAP) to the United States Environmental Protection Agency (USEPA) and the Michigan Department of Environmental Quality (MDEQ).

A comprehensive review of available remedial alternatives was undertaken during the FFS process; however, the intent of the selected environmental remedy is to enable the remedial action to be completed in conjunction with the following events:

- Demolition of the former General Die building including the foundations.
- Installation of a hydraulic barrier along the southern boundary of the former General Die Casting property.
- Excavation and disposal of cyanide-impacted soil and groundwater on the Central Steel and Wire property south of the former General Die Casting property.
- Reconstruction of the Central Steel & Wire driveway located adjacent to the south of the former General Die site to allow heavy truck traffic.
- Installation of an impermeable cap on the former General Die Casting property.

Thus, although a comprehensive overview of potential environmental remedies was completed, only those alternatives suited for implementation with the future property plans were retained for further consideration and cost evaluation.

2. Site Background Summary

2.1 Site Location

The former General Die Casting site is an approximately 0.6 acre site located at 13700 Mount Elliott Avenue in Detroit, Michigan (see Figure 1). An approximately 21,000 square foot building constructed of brick and cinder block and formerly utilized for zinc die casting and electroplating operations is located at the southwestern corner of the site. The eastern portion of the former General Die Casting property is not paved, and the exposed surface soils consist of dark brown granular material that includes concrete and brick fragments, gravel, coal, metallic slag, and scrap metal. The remainder of the site is either landscaped or asphalt-paved (see Figure 2).

The former General Die Casting site is situated within the northwestern quadrant of Section 16, Township 1 South, Range 12 East (see Figure 1). According to the USGS 7.5-minute Highland Park, Michigan topographic map, no surface water bodies are present within at least a one-mile radius of the site and the general site area elevation is approximately 625 feet above mean sea level. Based on site observations, the elevation of the former General Die Casting site appears to be approximately 4 to 5 feet higher than the properties to the east, south, and west.

The site is bordered to the north by Gallagher Kaiser, to the west by Mount Elliott Avenue, to the east by railroad tracks, and to the south by Central Steel & Wire (see Figure 2), all of which are zoned for heavy or moderate manufacturing site use. The portion of the Central Steel & Wire driveway that extends easterly from Mount Elliott Avenue approximately 300 feet is the area designated for reconstruction (see Figure 2).

A summary of historical site investigation and environmental impacts are presented in the FFS.

2.2 Geology

According to site investigations and soil boring logs completed by TOXICO and ARCADIS Geraghty & Miller, fill material ranging from approximately 2 to 10 feet thick is present immediately below ground surface at the site. A continuous gray silty clay unit is present immediately below the fill material, and this clay unit was documented to be a minimum 6 feet thick and extend to a minimum depth 14 feet below ground surface (depth of deepest soil boring).

Consistent with the TOXICO findings, ARCADIS Geraghty & Miller identified the subsurface geology in the three soil borings conducted in the northern driveway of the Central Steel & Wire property to consist of approximately 2.5 to 6 feet of dark brown to black sandy fill material overlying a continuous gray silty clay unit. The subsurface geology of the former General Die Casting property consists of approximately 7 to 9.5 feet of dark brown to black sandy fill material, containing variable amounts of other fill materials, overlying the gray silty clay unit.

2.3 Hydrogeology

Based on subsurface conditions observed during the installation of the six site monitoring wells in January 1997 and subsequent depth-to-water measurements collected from the monitoring wells, groundwater at the site is perched and confined to the shallow fill material that overlies the continuous clay unit. The depth to perched groundwater varies across the site, from a depth approximately 5 feet below ground surface on the former General Die Casting property to a depth approximately 1 foot below ground surface on the Central Steel & Wire property. This difference in depth to groundwater across the site is attributed to the ground-surface elevation difference between the two properties. The Central Steel & Wire property is approximately 4 to 5 feet lower in elevation than the former General Die Casting property.

ARCADIS Geraghty & Miller collected three rounds of depth-to-water measurements at the site after the installation of the monitoring wells; however, a perched groundwater-flow gradient and direction could not be identified. The perched groundwater-elevation measurements obtained in December 1998 and March 1999 are representative of these data collection activities and are presented on Figures 8 and 9, respectively of the FFS. As shown on these figures, there is no significant perched groundwater gradient trend at the site; perched groundwater does not appear to flow in any defined direction; and perched groundwater elevation contours cannot be inferred. Thus, the perched groundwater is believed to be relatively stagnant, remaining at the approximate location where the water infiltrated into the subsurface.

2.4 Regulatory Cleanup Criteria Evaluation

Based on the results of the regulatory screening evaluation presented in the FFS, ARCADIS Geraghty & Miller compared the site perched groundwater-quality and soil-quality data to the MDEQ Groundwater Contact Criteria, the MDEQ default or calculated site-specific background levels, Soil Criteria Protective of Groundwater Contact, and Soil Direct Contact Criteria to determine the remedial action objectives.

Based on an evaluation of site conditions and the site-specific potential exposure pathway analysis, the following are the only MDEQ soil screening criteria believed to be relevant for the site:

- Statewide Default or Site-specific Soil Background Levels.
- Soil Criteria Protective of Groundwater Contact.
- Soil Direct Contact Criteria.

Based on an evaluation of site conditions and site-specific potential exposure pathway analysis, the following is the only MDEQ Groundwater Cleanup Criterion believed to be relevant for the site:

- Groundwater Contact Criteria.

2.5 Contaminant Distribution

Based on the results of the ARCADIS Geraghty & Miller investigations, the area of perched groundwater impacts requiring remedial action is localized beneath the Central Steel & Wire northern driveway, within the vicinity of Monitoring Well MW-2. Cyanide-impacted soils requiring remedial action are also located within the Central Steel & Wire northern driveway.

An evaluation of the historic site data collected by TOXICO indicates soil-quality exceedances of the MDEQ Direct Contact Criteria beneath the former General Die Casting building and within the eastern portion of the site.

2.6 Recommended Remedial Alternative

ARCADIS Geraghty & Miller conducted the FFS and developed a list of remedial alternatives for the site. After evaluating each remedial alternative, ARCADIS Geraghty & Miller recommended the implementation of Remedial Alternative #1: Site-wide Direct Contact Barrier on former General Die Casting property with Building Foundation Retained, Sheet Pile Hydraulic Barrier along former General Die Casting Southern Boundary, Source Excavation at Central Steel & Wire Northern Driveway, and Perched Groundwater Monitoring (see Figure 3). This is believed to be the most technically feasible and cost-effective option.

However, after discussions with the current property owner, The City of Detroit, Remedial Alternative #1 was removed from consideration due to concerns from the City of Detroit and Remedial Alternative #2 was substituted as the preferred remedial

alternative. Remedial Alternative #2 is composed of a Site-wide Direct Contact Barrier on former General Die Casting property with Building Foundation Removed, Sheet Pile Hydraulic Barrier along former General Die Casting Southern Boundary, Source Excavation at Central Steel & Wire Northern Driveway, and Perched Groundwater Monitoring

3. Site Activities

3.1 Preliminary Site Activities

3.1.1 Health and Safety Plan

ARCADIS Geraghty & Miller will prepare a health and safety plan (HASP) for its field personnel and subcontractors. The purpose of the HASP is to establish the policies and procedures for protecting the health and safety of site personnel. It will contain information about the known or suspected site hazards, routine and special safety procedures that must be followed, and other instructions for safeguarding the health of site personnel. The HASP will also include important chemical and physical data on the compounds of concern, level of protection upgrade criteria, important telephone numbers and contacts, and a map showing the route to the nearest appropriate medical facility.

3.1.2 Contact Regulatory Agencies

Five working days prior to the start of groundwater sampling, ARCADIS Geraghty & Miller will notify the MDEQ and USEPA that remedial activities are scheduled to begin. ARCADIS Geraghty & Miller will notify Mr. Edward Novak of the MDEQ and Mr. Thomas Williams of the USEPA in writing and by telephone.

3.2 Remedial Action Implementation Activities

The remedial activities to be conducted at the site consist of the following activities:

- Demolition of the former General Die Casting building.
- Removal of the foundation.
- Installation of the hydraulic barrier.

- Excavation of soil and groundwater on the Central Steel and Wire Property.
- Installation of a site wide direct contact barrier on former General Die Casting property.

3.2.1 Demolition of the General Die Casting Building and Foundation Removal

The former General Die Casting building will be demolished and the foundations will be removed to a depth 3 feet below ground surface. The removal of the foundations is required by the City of Detroit as part of the access agreement. The existing interior plating machine components will be removed as scrap material. The building interior has been decontaminated by USEPA as part of the Emergency Response Actions at the site and therefore no additional decontamination will be necessary prior to demolition.

General Die Casting has contracted an asbestos abatement firm to remove friable asbestos containing material from the building. The asbestos abatement is complete.

The building will be demolished and the demolition debris will be disposed of as appropriate. The demolition contractor will secure all necessary permits from the City of Detroit required to demolish the building. The demolition contractor will arrange for the discontinuance of all public utilities and will disconnect the public utilities.

3.2.2 Site-wide Direct Contact Barrier on the General Die Casting Property

To prevent unacceptable exposures to potentially impacted soils beneath the former General Die Casting site, as well as protection from infiltration, a direct contact barrier will be placed over the site after the former General Die Casting building has been demolished.

Any areas which need filling after the demolition activities on the site (i.e., former plating line pits and sumps) will be filled with soil. The areas of the site outside of the building foundation will have an asphalt cover placed over them.

The concrete building footprint will be excavated during building demolition activities. The direct contact barrier will consist of the placement of 2 feet of soil within the area of the former building footprint, and the placement of an asphalt surface cover across the entire site.

3.2.3 Hydraulic Barrier along General Die Casting Southern Boundary

Slurry walls, various soil admixture walls, grout curtains, and structural walls can be used as hydraulic barriers to reduce the migration of perched groundwater. To function properly, the barriers require anchorage or sealing into a relatively impervious subsurface unit, such as bedrock or clay, and may demonstrate varying efficiencies with respect to flow modification and chemical compatibility.

The sheet pile wall will be installed parallel to the southern side of the former General Die Casting building between the driveway and the building. The existing small fence parallel to the driveway will be removed to install the wall. The wall will be 400 feet long and will extend in both the eastern and western directions 50 feet from the building edges. The hydraulic barrier wall will extend to a depth 10 to 12 feet where it will be keyed into the clay confining layer. The hydraulic barrier wall will be installed prior to the excavation of the Central Steel & Wire northern driveway to reduce perched groundwater infiltration into the construction area. As a long-term remedial component, it will serve to minimize the off-site migration of any residual contamination below the former General Die Casting building.

The joints in the sheet pile wall will be sealed with a watertight polymer sealant. The sealant to be used will be Adeka Ultra Seal A-50. The Ultra Seal is a flexible, expansion joint compound that is chemically resistant and will form a watertight seal at the joint of each sheet pile intersection.

3.2.4 Source Excavation at Central Steel & Wire Northern Driveway

Several treatment and disposal options for the excavated soils and perched groundwater were considered during the FFS. The source removal for the Central Steel & Wire driveway area consists of excavation and off-site disposal as outlined below.

Prior to the start of excavation activities, a Geoprobe unit will be mobilized to the site to take samples in various parts of the driveway. These samples will be composited and submitted for a Toxicity Characteristic Leaching Procedure (TCLP) analysis, per landfill disposal characterization requirements. This sample will be submitted and analyzed prior to commencement of excavation activities to ensure acceptance of the soils by the landfill.

The driveway from Mt. Elliott to the edge of the Central Steel & Wire building will be removed to a depth 3 feet below ground surface, as required for the installation of a new concrete drive. This area is approximately 30 feet wide by 300 feet long, and approximately 1,000 cubic yards of soil will be removed from this area. Additionally, the area within the vicinity of Monitoring Well MW-2 has reported concentrations of cyanide above MDEQ cleanup criteria at 3 feet below ground surface, and it is likely that these impacts extend below 3 feet. As documented by previous soil boring investigations, the depth to the confining silty clay layer in this area is approximately 6 to 8 feet below ground surface. Therefore, as indicated on Figure 3, the soil excavation in this area will extend to 8 feet below ground surface.

The excavation will require the removal of Monitoring Wells MW-1 and MW-2. These monitoring wells will be reinstalled after the completion of the new driveway for use in the long-term perched groundwater monitoring program. A storm sewer line currently exists beneath the driveway at an unknown depth. A manhole is located near the eastern edge of the proposed excavation. The manhole will be left undisturbed as the soil is removed around it to a depth of 3 feet. It will be assumed that the top of the sewer line is buried deeper than the proposed excavation and will not pose any problems during the excavation.

Thus, the total volume of soil to be excavated from the Central Steel & Wire northern driveway and disposed off-site as nonhazardous material is approximately 1,600 cubic yards. The clean soil removed for the driveway renovation will be mixed with the soils in the "hot zone" so that the soil entering the landfill is well mixed and uniform in concentration. During the excavation activities, a single composite sample will be taken from the excavated soils for disposal approval at the ONYX North America, Corporation (ONYX) landfill in Northville, Michigan.

Given the volume of soil to be removed and assuming the water level in the driveway is approximately 1 foot below ground surface, the area will have to be dewatered of approximately 85,000 gallons of perched groundwater during the excavation. The perched groundwater will be disposed at an off-site treatment facility.

- 1,600 cubic yards of nonhazardous soil, which is below the MDEQ Direct Contact Criteria will be shipped to the ONYX, landfill without treatment.
- The excavation will last five days with continuous dewatering required.
- 85,000 gallons of nonhazardous wastewater (generated from dewatering) will be shipped to the City Environmental, Inc. treatment facility.

Soil removal will be conducted by excavating the backfill material and immediately placing it in trucks for delivery to the ONYX landfill. Soil in need of drying will be placed on plastic sheeting and mixed with dry soil prior to loading onto trucks. Standard earth-moving equipment will be used for excavation activities. Appropriate health and safety precautions will be employed to protect workers during the excavation activities, and engineering controls will be utilized, as needed, to minimize dust generation. During excavation, it is estimated that water will be encountered at a relatively shallow depth. Using high capacity transfer pumps, dewatering will be conducted concurrently with excavation activities. The water will be pumped into one of three mobile tanks that will be parked on-site. These tanks, commonly referred to as frac tanks, will have a capacity of 18,000 gallons. When each tank nears capacity, a representative sample will be collected and analyzed for total and reactive cyanide on a rush (24-hour turn around time) basis. The analytical results will dictate whether or not the water can be disposed as hazardous or nonhazardous. For the purposes of the site activities, it is assumed that the water will be mixed well enough to dispose as nonhazardous. A vacuum truck will be used to transport the water from the frac tanks to the treatment facility as needed. Wastewater generated during equipment and personnel decontamination activities will also be pumped into the frac tank. Upon completion of the excavation, the frac tanks will be washed, emptied, and removed from the site.

Per the MDEQ *Verification of Soil Remediation Guidance Document* (April 1994, Revision 1), the following information is presented for confirmatory closure sampling after the soil has been removed from the excavation. The floor and sidewalls of the excavation will be sampled to document soil quality. Nine soil samples will be collected from the floor of the excavation, and an additional 11 samples will be collected from the sidewalls. These samples will be sent under chain of custody to STL/Savannah Laboratories & Environmental Services, Inc. in Savannah, Georgia for the following analyses: VOCs, SVOCs, metals, total cyanide, and amenable cyanide.

Approximately 810 cubic yards of clean backfill material will be required to restore the deep part of the excavation to the level of the driveway subbase. In the other areas between the driveway and the Central Steel & Wire building where a gravel cover currently exists, the gravel will be replaced to the current grade to match current site conditions. Areas where the driveway is to be installed will be backfilled to a depth approximately 3 feet lower than the current elevation to allow for the installation of an engineered driveway subbase below the asphalt drive. The driveway reconstruction is not included as part of this remedial action project.

3.2.5 Decontamination Procedures

3.2.5.1 Sampling Equipment

ARCADIS Geraghty & Miller decontaminated sampling equipment (stainless-steel trowel) before collecting each soil sample. The sampling equipment was decontaminated in the following order:

1. Washing and scrubbing equipment with a nonphosphate detergent solution,
2. Rinsing the equipment with deionized water, and
3. Air-drying the equipment.

3.2.5.2 Drilling Equipment

The drilling contractors decontaminated sampling equipment (i.e., Geoprobe rods, Geoprobe samplers) before and after collecting soil samples. The sampling equipment was decontaminated in the following order:

1. Removing large soil particles by hand,
2. Power-washing the drilling equipment with high-pressure hot tap water, and
3. Air-drying the equipment.

A decontamination area was constructed near the former General Die Casting building. A plastic-lined containment area will be constructed, and the drilling equipment will be placed on wooden pallets on plastic sheeting. The rinseate will be collected in a low spot in the plastic and pumped into the onsite frac tank. The decontamination fluids will be disposed of at a licensed liquid disposal facility.

3.2.6 Perched Groundwater Monitoring

Perched groundwater monitoring involves scheduled, periodic sampling and analysis of perched groundwater underlying the site to evaluate site conditions after implementation of the remedial activities. Monitoring the perched groundwater will be a valuable component to evaluate perched groundwater-quality. Therefore, after the remedial actions have been completed, a perched groundwater-quality monitoring program will be implemented.

The monitoring program will include sampling and analysis for cyanide, metals, VOCs, and SVOCs from four monitoring wells that were selected to enable the evaluation of perched groundwater quality throughout the site. The four wells selected for the perched groundwater monitoring program include existing Monitoring Well MW-6, replacement Monitoring Wells MW-1 and MW-2, and a proposed new Monitoring Well MW-7 (see Figure 3). It is assumed that perched groundwater monitoring would be conducted quarterly for the first year, then annually for years 2 through 30. Water-level monitoring will also be included in the perched groundwater monitoring program to provide necessary data to evaluate perched groundwater flow.

Water-level measurements will be collected from the seven site monitoring wells during each sampling event. An annual letter report will be prepared to document perched groundwater analytical results and trends, present water-level data and a corresponding perched groundwater flow map, evaluate whether remedial action objectives have been met, and determine if any modifications to the perched groundwater monitoring program would be appropriate.

For the purposes of the Work Plan, it will be assumed that the perched groundwater monitoring program will continue for a period of 30 years. However, it is likely perched groundwater remedial goals will be reached prior to that and monitoring activities can be discontinued prior to that time.

ARCADIS Geraghty & Miller will collect groundwater samples using a low-flow sampling procedure. Groundwater samples will be analyzed for VOCs. ARCADIS Geraghty & Miller's standard procedure for low-flow sampling, including a YSI monitoring instrument, is described below.

- Prior to purging and sampling, each well will be opened to allow the water level to equilibrate with atmospheric air pressure. After equilibration has occurred (approximately 15 minutes), the depths to water and total well depths will be measured using an electronic water-level meter.
- Prior to purging, the static perched-water elevation will be measured. The groundwater level will be continuously monitored during purging and sampling.
- A peristaltic pump will be used to purge and sample the wells. The discharge rate of the pump will be adjusted so that the static head will not be lowered during purging or sampling.

- The pump intake will be placed at a depth corresponding to the center of the screened interval.
- The discharge from the pump will be directed through a flow-through cell fitted with dedicated probes that measure dissolved oxygen, pH, oxidation/reduction potential, temperature, and specific conductivity.
- The values for dissolved oxygen, pH, oxidation/reduction potential, temperature, specific conductivity, and water level will be recorded every 10 minutes until three consecutive readings with 10 percent or less variation are recorded for all parameters.
- The discharge tubing will be disconnected from the flow-through cell, and a perched-water sample will be collected in pre-cleaned, laboratory bottles.

The groundwater samples will be placed in an ice chest and submitted, along with chain-of-custody documentation, to STL/Savannah for analysis for cyanide, metals, VOCs, and SVOCs using USEPA Methods 8060, 6000 and 7000-series, 8260 and 8270, respectively. Laboratory method detection limits and analytical methodology will be consistent with Operational Memorandum No. 6, Revision 4, 1995, as included in Part 201 of Michigan Public Act 451. Standard laboratory turnaround time (two weeks) will be requested.

A schedule for the implementation of the remedial activities is presented in Appendix A.

4. Restrictive Covenant

A restrictive covenant for the former General Die Casting property will be prepared to prohibit the use of on-site groundwater. The restrictive covenant will be filed with the MDEQ and the local unit of government to prohibit any consumptive use of site perched groundwater, prohibit irrigation with site perched groundwater, and restrict the removal and disposal of any perched groundwater during any construction activities.

The restrictive covenant will follow the format required by the MDEQ as outlined in the most recent guidance documents published by the MDEQ.

5. Remedial Action Plan

A Remedial Action Plan (RAP) will be prepared at the completion of the remediation activities to document that (1) the remedial actions have met the site-specific cleanup goals, and (2) the results of the groundwater monitoring activities have met site cleanup goals. The RAP will document activities and will include analytical results, disposal documents, figures, tables, and conclusions.

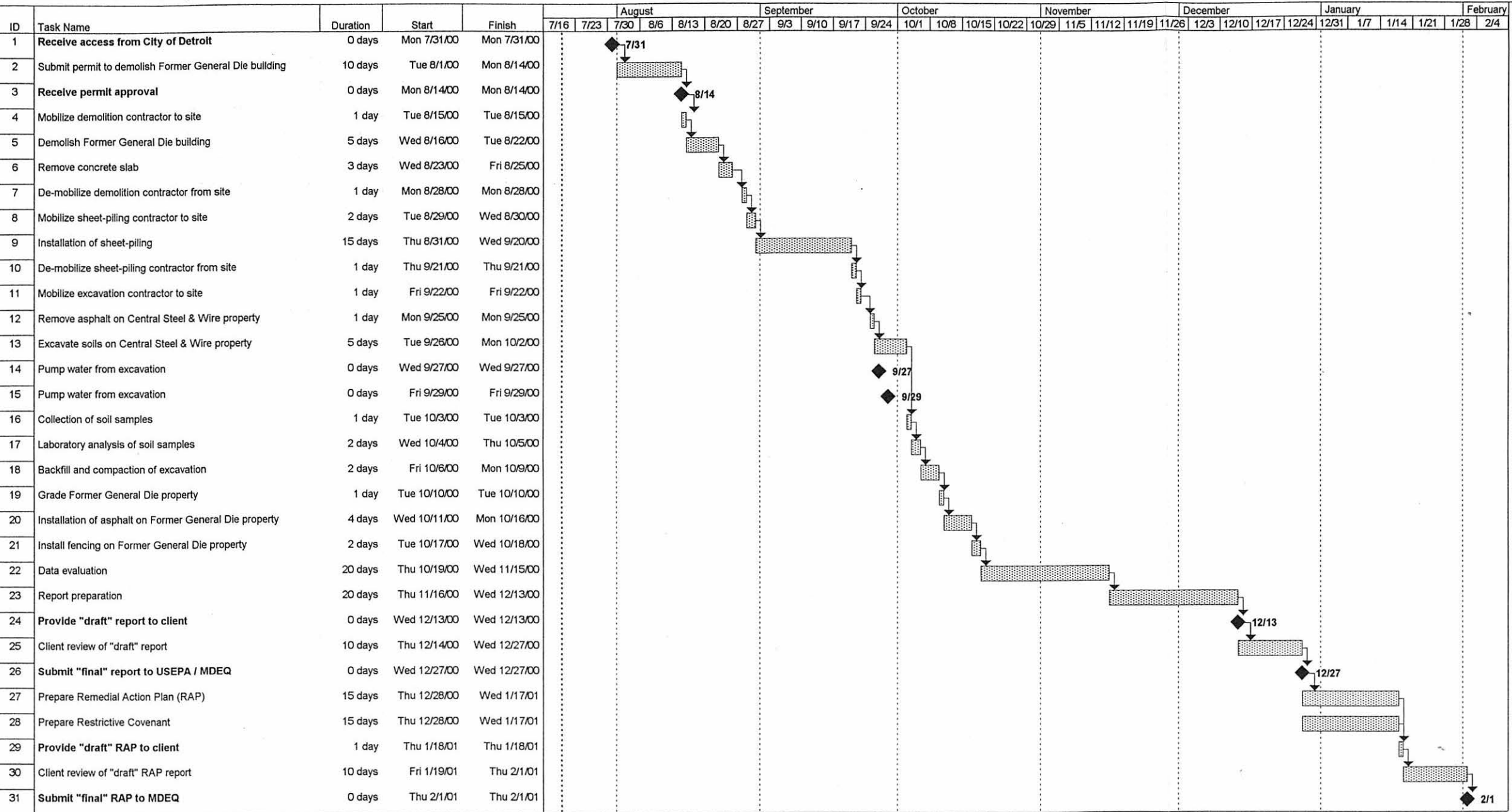
The RAP will identify the remedial actions completed, sampling and analyses procedures and will include a map indicating sampling locations; tables of analytical data; statistical evaluation of analytical data (if necessary); and field notes as proposed in the Remedial Activities Work Plan.

The RAP will follow the generic outline presented in the technical guidance issued by the MDEQ as required by Part 201 of Public Act 451, the Natural Resources and Environmental Protection Act, 1995 as revised.

Appendix A

Remedial Activities Schedule

Former General Die Remedial Action Proposed Schedule, Detroit, Michigan.



Project: Former General Die Casting
Date: Thu 7/20/00

Task
Split



Progress
Milestone



Summary
Rolled Up Task



Rolled Up Split
Rolled Up Milestone

Rolled Up Progress
External Tasks



Project Summary

